

## WE CLAIM:

1. A device for detecting a target molecule in a sample solution comprising:  
magnetic beads having in contact therewith polynucleotides capable of participating in  
5 an anchored strand displacement amplification reaction; a flow cell having channels for  
receiving a flowable medium, said flow cell further having at least one micro sensor  
comprising sensor pads and electrodes associated with each sensor pad.

2. A device according to claim 1 wherein said polynucleotides on each bead  
comprise a population of polynucleotides, said population further comprising both  
10 cleavable and noncleavable single stranded polynucleotides, wherein said cleavable and  
noncleavable quality is determined with respect to nicking of said polynucleotides in said  
strand displacement amplification reaction.

3. A device according to claim 2 wherein said population of said single stranded  
polynucleotides comprises nucleic acid sequences that are capable of hybridizing to 5' or  
15 3' sequence of a target nucleic acid.

4. A device according to claim 2 wherein said sensor comprises between 64 and  
4096 individual sensor pads.

5. A device for detecting a target molecule in a sample solution comprising:  
magnetic beads having in contact therewith polynucleotide probes capable of  
20 hybridizing to a target nucleic acid sequence; a flow cell having channels for receiving a  
flowable medium, said flow cell further having at least one micro sensor comprising  
sensor pads, said pads further having in contact therewith polynucleotide probes capable  
of participating in an anchored strand displacement amplification reaction.

6. A device according to claim 5 wherein said polynucleotides on each sensor  
25 comprise a population of polynucleotides, said population further comprising both  
cleavable and noncleavable single stranded polynucleotides, wherein said cleavable and  
noncleavable quality is determined with respect to nicking of said polynucleotides in said  
strand displacement amplification reaction.

7. A device according to claim 6 wherein said population of said single stranded  
30 polynucleotides comprises nucleic acid sequences that are capable of hybridizing to 5' or  
3' sequence of a target nucleic acid.

8. A device according to claim 6 wherein said sensor comprises between 64 and 4096 individual sensor pads.

9. A method for detecting target molecules comprising:

5      a. mixing microbeads of claim 1 or 5 with a sample solution containing a least one target nucleic acid of interest;

10     b. contacting said target nucleic acid to either said microbeads or said sensor pads;

10     c. performing a strand displacement reaction on said target nucleic acid sequence;

10     d. contacting said microbeads following said reaction of (c) with a micro sensor;

10     e. binding said microbeads to said sensor; and

10     f. detecting the presence of said microbeads bound to said sensor.

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